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far the prettiest shape. Tanks can be purchased, generally, at the bird or plant stores of large cities; the prices range from six dollars upwards. Sometimes a stand for the tank is made in connection with it, or of a similar material. It is well to remember in selecting a stand, the enormous weight which it will have to bear when the tank is filled with stones and water.—*To be continued.*

HINTS ON TAXIDERMY.

BY C. A. WALKER.

Equipment for the travelling collector.—The travelling collector should equip himself with a double-barrelled gun (and a rifle when large animals are sought for), ammunition, including shot for small birds and mammals (numbers 2, 6, 8, and 10,—the latter should never be omitted); dissecting instruments, scissors, needles and thread, preservative drugs and preparations, and alcohol about 80 per cent. in strength; tin cans of various sizes for containing alcoholic specimens, since glass bottles and jars are liable to be broken during transportation; cotton and tow for stuffing the skins of birds and mammals; fishing lines and hooks, casting net, a seine for catching fishes in small streams, the two ends of which should be secured to long wooden handles, which are held in the hands of two persons upon opposite banks; in this position it can be drawn both up and down the stream. He should also carry with him a geological hammer and steel chisels for collecting fossils and rock specimens, and small pocket vials and cork-lined boxes for insects.

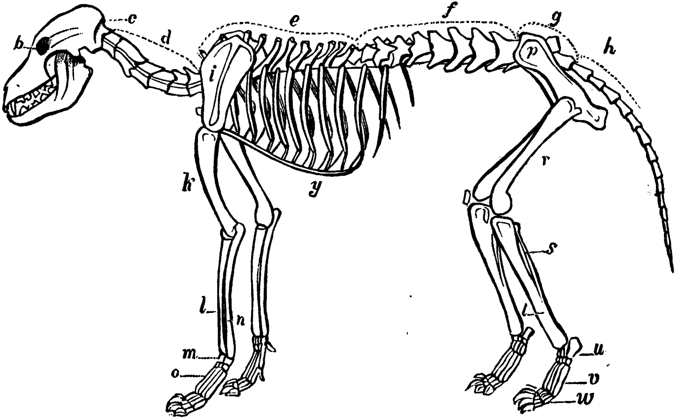
Preservatives.—Common powdered arsenic should be employed for skins to be mounted at once, instead of arsenical soap, as it has a tendency to dry them quickly. It may be applied dry, or mixed with alcohol until it is of the consistency of syrup; in the former case it should be dusted upon the skin by means of a small sieve; in the latter it is necessary to apply it with a brush. Arsenical soap should be used only upon skins which are intended to be kept for a long time before being mounted. It is composed of the following ingredients: powdered arsenic ½ lb., camphor 1¼ lb., salts of tartar 3 oz., powdered lime 1 oz., bar soap ½ lb.

The soap should be cut into very fine slices, put into a tin dish with warm water, and stirred over a moderate fire until thoroughly dissolved; the powdered lime and salts of tartar should then be added and mixed with the soap. The preparation should next be removed from the fire, the powdered arsenic, and lastly the camphor (powdered and dissolved in a little alcohol) added, stirring the mixture all the while. The whole should have the consistency of flour paste; if it be too thick add a little water, taking care not to hold it over the fire after the camphor has been added, as heat will cause the latter to evaporate speedily. After cooling it place it in a jar with a brush passing through the stopper, and label the jar "*poison.*" In extreme cases when the above preparations cannot be obtained, the skin should be rubbed with salt or with alum, or filled with spices and strong smelling herbs. These are by no means a substitute for arsenic, and are to be used only when the latter cannot be obtained. The skins of large animals should be soaked in a solution of alum, arsenic and salt, or in weak arseniated alcohol for several days.

Directions for preliminary work.—When a specimen has been killed the mouth should be opened, cleaned and filled with cotton or tow; the nostrils and vent, and any wounds should be treated in the same way to prevent blood or other secretions from exuding. It is essential to remove the skin as soon as possible after death. Should this be inconvenient, the internal organs should be taken out and the cavity filled with powdered charcoal if it can be had, if not, salt should be used. Previous to removing the skin, an accurate measurement should be taken of the subject in the manner indicated below.*

The color and general character of the hair, as well as any change of the same at different seasons of the year, the sex, and any other peculiarity known should be carefully written down and preserved. Skins should never be packed for transportation until thoroughly dry; they should then be placed in a box containing plenty of camphor, having its sides and joints perfectly closed with pitch to prevent the invasion of insects. It is well to saturate the inside of the box with benzine before placing the skins within. Never allow a box containing skins to be placed in any damp place.

Fig. 29.†



Instruments and materials used.—Of instruments and materials useful to the taxidermist in mounting mammals, birds, fishes and reptiles, the following are needed: A scalpel

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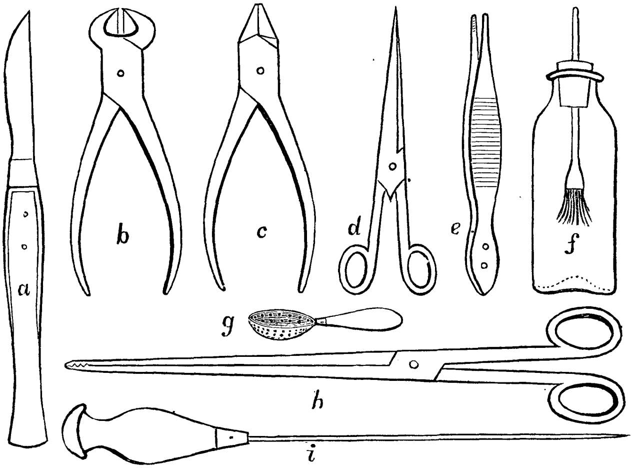
*The following are the general measurements which should be taken of a quadruped:

Total length; nose to occiput; nose to eye; nose to ear; nose to end of tail; length and width of ears; tail from root to end of vertebræ; tail from root to end of hairs; length of the different joints of the forelegs; length of the different joints of the hind legs; forefeet from wrist; hind feet from heel; length of toes; length of nails.

†Explanation of Fig. 29:—*b*, eye; *c*, occiput; *d*, cervical vertebræ; *e*, dorsal do.; *f*, lumbar do.; *g*, sacral do; *h*, caudal do; *i*, scapula; *k*, humerus; *l*, radius; *n*, ulna; *m*, carpal bones; *o*, metacarpal bones; *p*, pelvis; *r*, femur; *s*, fibula; *t*, tibia; *u*, tarsal bones; *v*, metatarsal bones; *w*, phalanges.

(Fig. 30, *a*); a pair of pincers for bending wire (*c*); a pair of wire cutters (*b*); a pair of small forceps for stuffing the necks of *small* birds and mammals and arranging feathers (*e*); a pair of larger ones, at least fifteen inches long, for stuffing the necks of *large* birds and mammals (*h*); a pair of dissecting scissors for cutting flesh and ligaments during the process of skinning (*d*); another larger and stronger pair for cutting tow; a large knitting needle inserted into a handle and sharpened at the end, for perforating the tarsi of birds previous to the insertion of the wires (*i*); a tin sieve with a cover for dusting powdered arsenic upon the skin (*g*); a wide-mouthed jar, with a brush passing through the stopper, for holding arsenical soap (*f*); tow for stuffing small birds and mammals (the finest quality being used for filling the necks); also hay, dried moss, etc., for those of larger size; needles for sewing up incisions; thread for winding; a large fish-hook with the barb filed off, for suspending specimens while skinning them. Annealed iron wire of various sizes, varying from 10 to 26,—No. 10 being used for supporting large specimens, No. 26 for humming birds, warblers, etc. A flat file of medium coarseness for pointing wire; a set of Aiken's

Fig. 30.



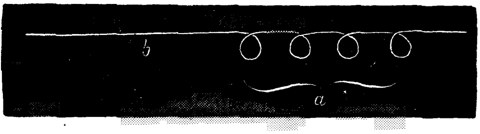
tools, containing various sizes of bradawls; a small gouge, chisels, etc., will be found very useful.

Method of skinning a mammal.—When an animal is ready for skinning, the mouth, nostrils and shot holes, should be filled with cotton or tow. Place the animal upon its back, take the scalpel in the right hand and with the left separate the hair to the right and left in a line from the front of the pubis quite down to the vent, so that the skin beneath can be plainly seen. Make a longitudinal incision along the course, directed in as straight a line as possible, taking care not to cut so deep as to expose the intestines. The skin should then be turned back on either side with the aid of the scalpel, working downward toward the back. When the thigh has been laid bare sever it from the pelvis at its junction with the femur or thigh bone. Layers of cotton or tow should, from time to time, be placed between the skin and body, as it will prevent the hair from being soiled. This operation should be repeated with the other side. Next the intestinal canal should be cut off a little way above the anus, and the tail separated close to the body. The skin should then be loosened from the back and breast until the forelegs are visible. Sever these at the shoulder joint or the base of the humerus. Remove the skin from the neck and the back part of the skull will appear. In skinning over the skull, care should be taken to sever the ears as close to it as possible; also not to injure the eyelids or cut too close to the lips. The carcass should next be separated from the skull at the first vertebræ, or the junction of the skull and neck. The next operation is to remove the tongue, eyes, and all the muscles attached to the head. Through an opening in the occipital bone, carefully clean out the brain. Next the legs should be skinned quite down to the claws of the feet, removing all muscles, but leaving the ligaments and tendons of the knees. The hind legs should undergo the same operation. Lastly, skin the tail as far back as the first three joints of the vertebræ, and to this stump fix a stout cord, which should be fastened to a hook or other projecting object on the wall. A strong piece of wood is then prepared, flat, and sharpened upon both edges. This should be introduced between the skin and the vertebræ, and by working it around the latter, the attachments will be severed and the vertebræ within can be easily pulled from the enveloping skin. In skinning the tail of the beaver an incision should be made upon the under side, running lengthwise from the base to the tip. The skin should then be loosened, beginning upon either side of the incision, until the flesh is entirely free, when it can be removed, the arsenic added, the skin restored to position, and the incision sewed up.

The foregoing method is practiced only upon the smaller quadrupeds; with the larger mammalia a different course is pursued. An incision is made from beneath the under jaw, in a straight line to the anus; transverse cuts are also made, running down the inside of both fore and hind legs. These being made upon the inner side will render the seams less conspicuous after the specimen has been mounted. To detach the hoofs, place them upon a stone and strike them repeatedly with a mallet; they will soon loosen and can be separated from the bone. After the operation of skinning has been completed, every part of the skin should be anointed thoroughly with arsenical soap. Turpentine applied to the nostrils and lips will prevent the approach of noxious insects. When the skin is too large for the application of the soap, it should be thoroughly saturated with a solution of "alum and water." The different bones left in the skin should all be thoroughly anointed with the preservative, and the eye-sockets and cavity of the brain filled with cotton or cut tow before replacing the skull in its natural position. If the animal be not too large the carcass should be preserved, as it will greatly aid the operator in his work of modelling a body. If immersed in alcohol, it can be kept any length of time.

To mount the skin; for instance that of a squirrel.—First provide yourself with tow, cotton, thread and twine; also, the stuffing forceps, a pair of pincers, file and wire cutters. With the aid of the forceps supply the various muscles of the face and head, by inserting cotton both through the mouth and eyelids. Take annealed wire of the proper size, and cut from the coil six pieces: No. 1, two or three inches longer than the total length of the body; Nos. 2 and 3 for the forelegs; Nos. 4 and 5 for the hind legs; each of these should be two, or even three inches longer than the limbs they are to support; No. 6, for a support to the tail, of the same proportionate length as the others. With a large pair of scissors, cut fine a quantity of tow, and with this, and the aid of the long forceps, stuff the neck to its natural dimensions. Taking wire No. 1, bend in it four small rings, the distance between the two outer representing the length of the body taken from the skin (Fig. 31, *a*), leaving one long end for a support to the head and neck (*b*). Mould tow about that part containing the rings, and by winding it down with thread, form an artificial body, resembling in form and size the natural one taken from the skin. Sharpen the projecting end to a fine point with the file, and insert it up through the cut tow in the neck, and thence through the skull; the skin should then be pulled over the body. Wires Nos. 2 and 3 should then be placed in position, by inserting them through the soles of the feet, up within the skin of the leg, and through the body of tow, until they appear upon the opposite side. With the pincers bend over the end of each, forming a hook; the wires must then be pulled backwards, thus fastening the hooks firmly into the body. The loose skin of the limbs should then be stuffed with cut tow, taking care to imitate the muscles of the living subject. Nos. 4 and 5 can be fixed in position after the same manner, except if the animal is to rest entirely upon its tarsi (as in

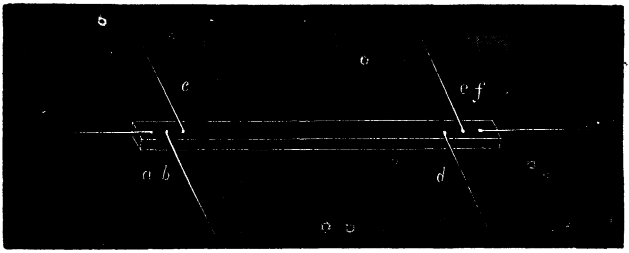
Fig. 31.



the case with the squirrel when feeding), then the wire must be inserted at the tarsal joint instead of the sole of the foot. If any depressions appear in the skin they must be stuffed out with the cut tow. Wire No. 6 should now be inserted at the tip of the tail, and forced down within the skin, hooking it into the body in the same manner as the leg wires. Stuff the tail to its proper dimensions, with cut tow, and carefully sew up the incision along the abdomen. Having prepared a board about three-quarters of an inch thick, pierce in it two holes at a proper distance apart for the reception of the leg wires (four holes would be needed if the animal were to stand upon all extremities); these must be drawn through upon the under side until the feet of the specimen rest close upon the upper surface, then they should be clinched, taking care that the wire does not protrude above the surface of the board as it renders the support unsteady. The different joints of the limbs can now be imitated by bending the wire at the proper points; also, a curve can be given to the back, and the tail can be set into proper position by simply bending the wires into the required shape. The eyes should now be placed in their position, a little putty having been previously inserted within the eyelid to serve as a cement. Care should be taken in arranging the eyelid, for the expression depends altogether upon this point. Clip off any superfluous wire which may extend above the head with the wire cutters. The specimen should then be placed in some locality free from moisture and allowed to dry thoroughly, when it is complete for the cabinet.

In mounting quadrupeds of large size the following formula should be pursued:—Procure a bar of wood, an inch thick and two inches broad, of a length equal to the distance between the shoulders and thighs; this should be placed within the skin, three holes having been previously made at one end, and two in the other, with a gimlet, for the reception of the various wires. This is used as a substitute for the central wire or body support. Having sharpened a piece of wire large enough to firmly support the specimen, force it down through the skull and neck, passing it through the gimlet hole at *a* (Fig. 32); when it appears on the under side bend the end into the form of a hook with the pincers, and drive it firmly into the wood. Next, the foreleg wires, well sharpened, should be forced up through the soles of the feet, and fixed into the bar of wood at *b* and *c*, in the same manner as the head support. Do the same with the hind leg wires, fastening them at the lower part of the bar, as at *d* and *e*. Lastly, the tail support should be placed in position, fastening it to the wooden bar at the point *f*. This completes the framework. A quantity of hay or moss should now be procured, and it is of the utmost importance that it should be thoroughly dry, otherwise the specimen is liable to mould. Commence filling the neck, keeping the wire in the centre of the material, and stuff downward to the forelegs; these should then be restored to form, taking care to imitate the muscles of the shoulder. In working down the body place the hay or moss between the bar of wood and the skin to avoid all stiff appearance; always place the stuffing material evenly within the skin, and never use pressure, as a fresh skin can be easily expanded far beyond its natural dimensions. Having reached the hind legs, imitate faithfully, by stuffing, all the natural muscles. When this part has been completed, sew up the various incisions; attention should be paid to separating the

Fig. 32.



hairs, and not to take any of them in along with the thread. Imitate the joints of the limbs by bending the wire at the proper points, and place the specimen upon the board, draw the wires through the holes with the pincers, and clinch them upon the under side. The specimen will then assume an erect position. The orifices of the eyes, mouth and ears, should be filled with cotton saturated with the preservative, and the artificial eyes put in while the eyelids are yet pliable. The lips can be secured in their proper position by means of pins, and the nostrils distended to their natural size, with pellets of cotton inserted within. In the larger mammalia the orifices of the head should always be anointed with *spirits of turpentine*. If any irregularities appear in the skin, they must be pressed down and modelled into shape with the hand. The muscles of the various parts of the body can be exactly imitated by making casts of plaster of Paris, and fitting them within the skin in lieu of other stuffing material.

Those gigantic beasts which roam about the forests of tropical countries, such as the elephant, giraffe, etc., have to be mounted upon wooden models. Perhaps the method cannot be better illustrated than by giving an account of the manner in which an elephant was mounted at the Jardin du Roi, at Paris, as related by Capt. Thomas Brown, F. L. S., in his work entitled "The Taxidermist's Manual:"

"The dead elephant being extended on the ground, the dimensions were all taken and correctly noted at the time. M. Lassaigne, cabinet-maker to the establishment, invented a large rule for that purpose, which was somewhat like a shoemaker's size-stick. The different curves of the back, belly, neck, etc., were taken by bars of lead, of three-quarters of an inch in thickness. This metal is much better adapted than any other for that and similar purposes; as it has no elasticity it retains any shape into which it is put. M. Demoulins made a drawing of the animal from these measurements, on the wall of the workshop where the model was constructed, of its natural size. The elephant was placed upon its back by means of four-corded pulleys fastened to the platform. An incision, in the form of a double cross, was then made in the lower side, the central line reaching from the mouth to the anus; the two cuts were made from the left leg, on both sides, to the opposite right legs. The trunk was longitudinally opened on its under side; the soles of the feet were now taken out to within an inch of their edge, and the nails allowed to remain attached to the skin. This was effected by the aid of a chisel and mallet, and was one of the most difficult operations of the whole. Several persons wrought at a time at the operation of skinning, and four days were necessary to effect it. When removed from the carcass, the skin was weighed, and found to be five hundred and seventy-six pounds. It was extended on the ground, so that the cutaneous muscles of the head and other parts might be cut away from its interior. The skin was then put into a tub, and covered six inches deep with water which had been saturated with alum. The model which was to fill the skin was made as perfect as possible in its shape. To insure this, models were made of half the head in plaster, as also a fore and hind leg. This structure was made of linden wood, and so ingeniously constructed by M. Lassaigne, that almost the whole parts could be separated. He opened a panel on one side of the body, whereby he introduced himself into its interior, so that he might make its parts more perfect within. Even the head and proboscis were hollow, which rendered this stupendous model so light that it could be moved from one place to another with comparative ease. The model being completed, the alum water, in which the skin had been all the time immersed, was now taken out and made boiling hot, and in that state poured on the skin, which was then allowed to soak in the warm liquor for an hour and a half, when it was taken out, still warm, and placed upon the model, which was accomplished with some difficulty. But judge of their own mortification when it was found that the model was rather too large. To diminish the woodwork they foresaw would run the risk of putting its parts out of proportion. It then occurred to them that the best thing to be done under these awkward circumstances was to take off the skin again, and reduce its thickness with knives; they removed all the internal thickenings which came in their way. In this operation five men were occupied for four days, during which time they cut out one hundred and ninety-four pounds weight off the internal surface. During this process the skin had dried, and required again to be immersed in cold soft water; after allowing it to remain twenty-four hours to soak, it was then put on the model, and found to cover it completely; the edges were brought together and secured with wire nails, deeply driven home, and large brads. Except at the edges, the nails and brads were only driven in half way, to keep the skin down to the different sinuosities and hollows until dry, when they were again all pulled out. The alum with which the water was saturated gave the skin an ugly gray appearance from crystallization. But this was soon remedied, by first rubbing the skin with spirits of turpentine, and afterward with olive oil. By the admirable and well executed contrivance here adopted, a specimen has been mounted with all the appearance of life, which, with a little attention, may resist for ages the influence of time."

[*To be Continued.*]